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**Expera Specialty Solutions, LLC
Boiler #7 Emission Test
at
Kaukauna, WI**

**November 21, 2013
Project #13-0174A**

Prepared by:

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December 12, 2013

**Bruce F.
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T.A.P.P.I.; WI Food Processors Assn.;
Wisc. Paper Council

EXP_000079

No. 7 Boiler Emission Results

11/21/2013

<u>Test Run</u>	<u>Volumetric Flow Rate</u> <u>dscfm</u>	<u>Isokinetic Ratio, %</u>	<u>Particulate Emission</u>	
			<u>lb./hr.</u>	<u>lb./MM Btu</u>
1	53,113	103.9	23.54	0.136
2	53,560	100.7	21.84	0.131
3	55,725	101.0	20.86	0.124
Average of 3 Runs	54,133		22.08	0.13
Sootblowing Emission Calculation				0.13*
Limitation				0.30

* 0.13 = $0.136((0.137+0.833)*0.137/4.001)+0.128*((24-0.137)/24-(0.138/4.001))$

Sootblowing occurred during run number one for 10 minutes. There is one ten-minute Sootblowing period per day. Calculation based on NR 439.07(8)(b)

II. Process Description

Boiler #7

The stack carries exhaust gases from the #7 boiler. The boiler is a Babcox and Wilcox stoker with vibrating hydrograte. The boiler is rated at 90,000 lb./hr. steam at 600 psi and 205 million BTU per hour. The source is equipped with multi clones and a wet scrubber. The boiler is capable of burning bark, paper, tires, natural gas and #6 fuel oil. During the tests the boiler was fired with bark. The average load during the three runs was 89.9% of capacity. Sootblowing occurred during run number one for ten minutes.

The #7 boiler test data sheet supplied by Thilmany personnel is contained in the Appendix. Fuel samples were taken by Thilmany personnel and sent in for an Ultimate analysis to determine a Fd factor. The analyses are contained in the Appendix. The calculated Fd factors are shown below.

<u>Test Run</u>	<u>Fuel F Factor</u>
1	9,258 dscf/MM Btu
2	9,335 dscf/MM Btu
3	9,399 dscf/MM Btu

Location:

#7 Boiler

Date:

11/21/13

Time:

8:40

10:00

11:20

9:42

11:02

12:22

Test Run

1

2

3

Average

STACK GAS DATA:

Temperature:	148.1	147.4	147.0	147.5
Velocity, ft/sec.	33.213	33.417	34.864	33.831
Gas Volume, acfm	76,235	76,703	80,026	77,655
Gas Volume, scfm (wet)	65,263	65,744	68,638	66,548
Gas Volume, scfm (dry)	53,113	53,560	55,725	54,133
Moisture, %	18.6	18.5	18.8	18.7
Carbon Dioxide, % (dry)	9.6	9.0	9.0	9.2
Oxygen, % (dry)	10.4	10.8	11.0	10.7
Nitrogen, % (dry)	80.0	80.2	80.0	80.1
Molecular Weight, (dry)	29.95	29.87	29.88	29.90
Molecular Weight, (wet)	27.73	27.67	27.65	27.68

SAMPLING DATA:

Total Time, min.	60	60	60	
Volume, dscf	43.622	42.624	44.486	
Isokinetic Ratio, %	103.9	100.7	101.0	

PARTICULATE EMISSION RATES:

Fronthalf Particulate, mg	141.8	127.6	121.7	130.4
Emission Rate, Fronthalf lbs/hr.	22.842	21.213	20.169	21.408
Total Particulate Collected, mg	146.1	131.4	125.9	134.5
Concentration, grains/dscf	0.0516	0.0475	0.0436	0.0475
Concentration, lbs/dscf	7.385E-06	6.798E-06	6.240E-06	6.808E-06
Emission Rate, Total lbs/hr.	23.535	21.845	20.865	22.081
Emission Rate, lb/1000 lb Stack Gas	0.0835	0.0771	0.0706	0.0771
Fo Factor	1.094	1.122	1.100	1.105
Fd Factor	9258	9335	9399	9331
F Factor Emission Rate, lb/MM BTU	0.136	0.131	0.124	0.130

Expera Specialty Solutions-- Kaukauna Mill
No. 7 Boiler PM Emission Test-- November 21, 2013

Run number	Run start time	Run end time	Ave. Steam Flow, M LBS/HR	Ave. Multiclone ΔP , " WC	Ave. Scrubber ΔP , " WC	Ave. Scrubber Flow, GPM	Ave. Scrubber Water Pressure, PSIG
1	11/21/13 8:40	11/21/13 9:42	78.9	4.3	5.8	205.1	2.8
2	11/21/13 10:00	11/21/13 11:02	81.9	4.4	5.9	205.2	2.9
3	11/21/13 11:20	11/21/13 12:22	81.8	4.7	6.4	204.9	2.9
AVERAGE			80.8	4.5	6.0	205.1	2.8
% of Full Load			89.8%				

Sootblowing occurred on Run 1 from 9-9:10 AM

Run 1 Fuel Sample: 9 AM
Run 2 Fuel Sample: 10:30 AM
Run 3 Fuel Sample: 11:45 AM